

REMARKS

In paragraph 2 of the Action, claims 1, 7-10, 14 and 15 were rejected under 35 U.S.C. 112, second paragraph. In paragraphs 4-7 of the Action, claims 1, 7-10, 14 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ota et al., Endo et al. and Oka et al.

In view of the rejections, claims 7-10 have been cancelled, and the subject matter of cancelled claims 7-10 has been incorporated into claim 1. Also, new claims 16 and 17 have been filed.

An antireflection film of the invention comprises an organic film, a hard-coating layer laminated on the organic film, a high refractive index layer laminated on the hard-coating layer, and a low refractive index layer laminated on the high refractive index layer. The antireflection film has a surface resistance of $5 \times 10^{12} \Omega/\square$ or less.

The high refractive index layer has a refractive index in a range of 1.65 to 1.85, and is formed of metal oxide particles of ITO with electrical conductivity and TiO_2 with high refractive index, and at least one synthetic resin selected from the group consisting of styrene resin, epoxy resin and acrylic resin. A volume percentage of the TiO_2 particles to a total volume of the TiO_2 and ITO particles in the high refractive index layer is 1 to 60%, and a volume percentage of the metal oxide particles to a total volume of the metal oxide particles and the synthetic resin is 20% or more.

The low refractive index layer has a refractive index in a range of 1.35 to 1.55. The low refractive index layer is formed of acrylic resin with fluorine or silicone resin, and further includes particles of fluorine resin in an amount of 10 to 40% by weight to improve reduction of refractive index of the antireflection film, resistance to scuffing and slipperiness of the antireflection film.

In the invention, in case the refractive index of the low refractive index layer is 1.45 or less, the antireflection film can provide a minimum surface reflectance of 0.5% or less.

In Ota et al., an antireflection film comprises a substrate 1, a hard coat layer 2, a high refractive index layer 5 and a low refractive index layer 3. The high refractive index layer 5 is formed of a binder resin, and fine particles including TiO_2 , CbO_2 , SnO_2 , ITO and so on. The low refractive index layer 3 is an SiO_2 gel film.

In the invention, the high refractive index layer is formed of the metal oxide particles of ITO and TiO_2 , and synthetic resin. Especially, a volume percentage of the TiO_2 particles to the total volume of the TiO_2 and ITO particles in the high refractive index layer is 1 to 60%. The specific volume percentage and the combination of the particles are not disclosed or suggested in Ota et al.

In the invention, the low refractive index layer is formed of acrylic resin with fluorine or silicone resin, and further includes particles of fluorine resin in an amount of 10 to 40% by weight. In Ota et al., the low-refractive-index layer is the SiO_2 gel layer, different from that of the invention.

Ota et al. includes the hard-coating layer and high and low refractive index layers, but Ota et al. does not disclose or suggest the specific structure of the invention.

In Endo et al., as shown in Fig. 7, an ultra fine particle film includes a substrate 71, a layer 72 with high refractive index particles, and a layer 73 with low refractive index particles. As the fine particles having a high refractive index, SnO_2 , In_2O_3 , TiO_2 and ZrO_2 , and the mixture thereof may be used. As the fine particles having a low refractive index, SiO_2 and MgF_2 may be used. The layer 72 containing particles of SnO_2 , In_2O_3 , TiO_2 , ZrO_2 , or mixture thereof is provided on the substrate 71 together with a binder, and the particles of SiO_2 or MgF_2 for the layer 73 are simply deposited on the layer 72.

In the invention, the high refractive index layer is formed of the metal oxide particles of ITO and TiO_2 , and synthetic resin, and the volume percentage of the TiO_2 particles to the total volume of the TiO_2 and ITO particles in the high refractive index layer is 1 to 60%. In Endo et al., TiO_2 is used, but the combination of ITO and TiO_2 is not disclosed or suggested.

In the invention, the low refractive index layer is formed of acrylic resin with fluorine or silicone resin, and further includes particles of fluorine resin in an amount of 10 to 40% by weight. In Endo et al., the layer 73 may contain SiO_2 , as shown in Tables 1 and 2, but the low refractive index layer of the invention, i.e. acrylic resin with fluorine or silicone resin and further including particles of fluorine resin, is not disclosed.

Therefore, Endo et al. does not disclose or even suggest the high and low refractive index layers of the invention.

In Oka et al., an antiglare layer 12 having a fine uneven surface is formed on a transparent substrate, and a layer 13 having a low refractive index is formed on the layer 12. The antiglare layer includes a matte material, such as plastic beads, and a binder resin. As a binder resin of the antiglare layer or high refractive index layer 12, an ionizing radiation curing resin, such as acrylic resin, can be used.

Acrylic resin is used in the high refractive index layer in Oka et al., but ITO and TiO_2 particles used in the high refractive index layer of the invention are not disclosed or suggested in Oka et al. Thus, the features of the invention are not disclosed or suggested in Oka et al.

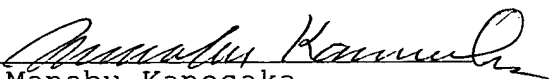
As explained above, the cited references do not disclose or suggest the features of the invention. Especially, the antireflection film of the invention includes the specific low refractive index layer formed of the acrylic resin with fluorine or silicone resin and further includes the particles of fluorine resin, as specified in claim 1. Even if the cited references are

combined, the present invention is not obvious from the cited references.

Reconsideration and allowance are earnestly solicited.

Respectfully Submitted,

KANESAKA AND TAKEUCHI

By 
Manabu Kanesaka
Reg. No. 31,467
Agent for Applicants

1423 Powhatan Street
Alexandria, VA 22314
(703) 519-9785